

ABSTRACT OF THE DISCLOSURE

The invention is concerned with a method of deriving mechanical work from a combustion gas in internal combustion engines and reciprocating internal combustion engines for carrying out the method. The invention includes methods and apparatuses for managing combustion charge densities, temperatures, pressures and turbulence in order to produce a true mastery within the power cylinder in order to increase fuel economy, power, and torque while minimizing polluting emissions. In its preferred embodiments, the method includes the steps of (i) producing an air charge, which step includes producing an air charge at atmospheric pressure or producing a compressed air charge at higher than atmospheric pressure, (ii) controlling the temperature, density and pressure of the air charge, (iii) transferring the air charge to a power cylinder of the engine such that an air charge selectively ranging in weight from below normal weight and density to a heavier-than-normal weight and density is introduced into the power cylinder, and (iv) then compressing the air charge at a lower-than-normal compression ratio, (v) causing a pre-determined quantity of charge-air and fuel to produce a combustible mixture, (vi) causing the mixture to be ignited within the power cylinder, and (vii) allowing the combustion gas to expand against a piston operable in the power cylinders with the expansion ratio of the power cylinders being substantially greater than the compression ratio of the power cylinders of the engine, whereby the invented method is capable thereby of producing a mean effective cylinder pressure selectively ranging from lower-than-normal to higher-than-normal.